THE PLANT DISEASE REPORTER

Issued by

THE PLANT DISEASE SURVEY, DIVISION OF MYCOLOGY AND DISEASE SURVEY
BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING
AGRICULTURAL RESEARCH ADMINISTRATION
UNITED STATES DEPARTMENT OF AGRICULTURE

Volume XXIX March 22, 1945 Number 10

The Plant Disease Reporter is issued as a service to plant pathologists throughout the United States. It contains reports, summaries, observations, and comments submitted voluntarily by qualified observers. The reports often are in the form of suggestions, queries, and opinions, frequently purely tentative, offered for consideration or discussion rather than as matters of established fact. In accepting and publishing this material the Division of Mycology and Disease Survey serves merely as an informational clearing house. It does not assume responsibility for the subject matter.

IN THIS ISSUE

William C. Snyder and Kenneth F. Baker report observations on diseases of cauliflower grown for seed in California, page - 248.

Occurrence of sweetpotato storage diseases in East Texas is reported by R. D. Watson, page - 253.

Storage diseases of potatoes are reported from various States, page - 257.

Storage diseases of apples observed in Virginia and West Virginia are reported by R. E. Atkinson, page - 263.

Storage diseases reported on carrots and onions, page - 265.

Diseases of vegetable crops, page - 267.

Alton E. Prince reports observations on tobacco downy mildew in South Carolina seedbeds, page - 270.

Reports on diseases of cereal and forage crops, page - 271, include a note by Alton E. Prince on a Microsphaera sp. found on soybean.

LIBRARY
CURRENT SERIAL RECORD
☆ APR 25 1945 ☆
U. S. DEPARTMENT OF AGRICULTURE

DISEASES OF SEED CAULIFLOWER IN CALIFORNIA

William C. Snyder and Kenneth F. Baker

The more important diseases of cauliflower (Brassica oleracea var. botrytis) in the United States are, like those of cabbage, seed-borne. These include the serious diseases of black rot (Bacterium campestre) and blackleg (Phoma lingam). The control of seed-borne troubles such as these, when the host is grown in a humid climate, depends largely upon the procurement of disease-free seed where its use is coupled with proper crop rotation and sanitation practises.

Since the quality of seed in relation to disease organisms is of the greatest importance to both the seed grower and the consumer, a survey of California acreages of seed cauliflower, similar to that previously reported for cabbage (4), was made during the 1943 and 1944 seasons.

Although cauliflower is grown for the market in many coastal counties in quantities which place California high among the list of States shipping the curds, the production of seed cauliflower is largely centered in Monterey, Santa Barbara, and San Luis Obispo Counties. Seed beds are customarily started in the summer, transplants made to the field in the early fall, and seed harvested the following summer.

Included among the varieties observed were Snowball types, various Winter Cauliflowers, and a number of European varieties grown for lend lease.

The estimated area of seed cauliflower grown in the United States in 1943 amounted to 224 acres, and in 1944 to 328 acres, with total yields approximating 71,510 and 140,808 pounds, respectively[1]. Almost all of this acreage was grown in California.

It is believed that nearly all of the fields comprising the California acreages were seen once or at intervals during the growing of the crop, from the seed bed stage to seed maturity.

Diseases Found

Downy mildew (Peronospora parasitica). - While generally present in cauliflower fields to some extent, downy mildew is not ordinarily important enough to require control. The disease often appears in the seed bed and has been known to destroy many of the seedlings in such plantings. Following transplanting to the field, downy mildew may become general during the late fall, winter, and spring months. Occasionally infection has been abundant enough to cause a scorching of the lower, outer leaves of scattered plants. Curd and stalk infections similar to those which have been described elsewhere on cauliflower (1) and cabbage (2) have been observed. In a few fields of the Snowball variety in these counties during the 1943 and 1944 seasons the infection of the curd, main stem, and smaller branches of the developing seed stalks was sufficiently damaging to cause some plants to fail to flower. Blackish zones and irregular blotches occurred in the interior of these seed stalks, and lesions near

---

[1] Bureau of Agricultural Economics. "Acreage and production of vegetable seeds in 1943 and 1944 (Reported by 130 commercial vegetable seed growers)". January 12, 1945.

the surface of the branches resulted in sunken, slightly discolored areas. Mycelium was found to be generally distributed in the sprouting curds of such plants and sporangiophores and sporangia were readily obtained from affected parts in moist chambers kept at low temperatures. Usually the center of the curd was first to show infection. Often the badly affected sprouts from such curds turned brown and succumbed to secondary organisms.

In late spring and summer downy mildew was less prevalent in Monterey County than during the winter but was still to be found on lower leaves, and occasionally in small lesions on the seed stalks and even the pods. Infection at this stage of crop development appeared to be unimportant here in quality or amount. In certain fields in Santa Barbara County downy mildew was abundant even in July, 1943, on plants then in pod. Infection was found at the base of the seed stalks, and upwards to and including pods, while some infected curds failed to push up at all. In the same area in 1944, downy mildew was only found in occasional heads and apparently was causing no real damage as late as April (rainfall the preceding month had been scant) but by August the disease had become abundant again, causing some damage at the base of seed stalks. Local infection in the center of the curd proved to be unimportant since normal development of the outer part of the curds continued unimpaired in these cases. Elsewhere (1) it has been found that there is considerable damage to the curd from secondary organisms. This condition is uncommon in California seed fields, perhaps because of climatic conditions.

In general downy mildew tends to be more prevalent and a little more damaging throughout the growing period of the crop in certain districts in Santa Barbara County than in Monterey County, but so far the losses sustained have not seemed to warrant attempts at control in the field. Protective measures against this disease may be taken by spraying with Bordeaux mixture or rosin-lime sulfur (3) in the seed bed.

White rust (Albugo candida). - The occurrence of white rust on cauliflower is of little importance from the economic standpoint, since little damage is ordinarily caused by it, but its presence is interesting since white rust is known on cabbage and cauliflower in Europe but apparently it is rare in this country.

For several years white rust has been known on cauliflower in Santa Barbara County and to a less extent in Monterey County. It has caused some damage to an occasional field in the former county in some years through its development on the pods and seedstalks, which show characteristic swellings and deformations. It was rare in both seasons on young plants in the same area. By the first of August white rust had become fairly destructive on the pods and seed stalks of certain of these seed fields, but was rare on leaves of young cauliflower plants nearby suggesting that seed stalks and pods are more susceptible to infection than leaves. Of the numerous wild and cultivated crucifers present in the areas the disease has been observed only on cauliflower and shepherd's purse. Its frequent occurrence on the flowering parts of these two hosts and its absence on other crucifers suggest the presence of a race specialized to these hosts. White rust caused by a different fungus, was found on salsify in the same district. In Monterey County white rust has rarely caused damage but has appeared in certain varieties from time to time. A trace was found in July of both crop years of the survey. In general,

however, white rust is not a factor in cauliflower seed production in the State and is of less importance than downy mildew.

Perhaps the non-occurrence of white rust on cauliflower in the United States may be attributed to the relatively small acreage grown for seed in this country prior to the war, mostly in California. Its occurrence in Europe may be explained by the fact that this was the principal source of cauliflower seed.

Ringspot caused by Mycosphaerella brassicicola. - Cauliflower is rather susceptible to the ringspot fungus, as has been shown in the market garden areas of Colma near San Francisco, but the principal seed areas have remained rather free from it. Traces of ringspot have been found in Monterey County on the lower leaves during the rainy season, but such infection has been insignificant. In one field in 1944, in the northern end of Monterey County, a trace of ringspot infection in the form of small black lesions was found on the leaves and on an occasional pod and seed stalk. The disease was not observed in Santa Barbara County or San Luis Obispo County.

Alternaria leaf spot caused by Alternaria brassicae and Alternaria sp. - Traces of Alternaria leaf spot are not uncommonly found on the lower leaves. A moderate foliage infection was general in the spring on basal leaves in Santa Barbara County, and less common in Monterey County. Except for a trace of pod infection in one late-planted field, no Alternaria lesions on seed stalks or pods were observed in either county during the years of the survey, and the disease is considered of no importance in California.

White blight caused by Sclerotinia sclerotiorum. - Apparently the amount of infection on the cauliflower seed crop caused by Sclerotinia depends to a large extent on the sclerotial populations remaining on the land (or adjacent to it) from some previous susceptible crop. Certain fields in the seed growing districts were found considerably damaged by white blight, whereas other fields in the same area were little affected. A 25% loss of plants was observed in the curd stage in one field in Monterey County in 1944, and several fields in Santa Barbara County were badly damaged in late spring and summer of both crop years. Infection commonly appears in the spring and spread of the disease may occur from the early curd stage through the podding period. That much of the infection was initiated in these seasons by ascospores was indicated by the common occurrence of infections on the upright foliage surrounding the curd, on the curd itself, and at various places on the seed stalks. In some instances the more serious loss of plants took place in the curd stage, in other cases not until the pod stage when the girdling of seed stalks greatly reduced yield. Although of no concern from the standpoint of seed-borne diseases, white blight has been serious enough in occasional fields to warrant the attention of the seed grower. Observations made in past seasons indicate the importance of avoiding land carrying a high inoculum potential, and of avoiding irrigation practises that keep the surface soil wet for long periods of time.

Botrytis cinerea frequently was found associated with white blight. In some cases in 1944 plant parts affected by Sclerotinia sclerotiorum and even the sclerotia of this fungus were over-run with Botrytis.

Powdery mildew (Erysiphe polygoni). - Light infection of the foliage by powdery mildew was not uncommon late in the season, but caused no damage. In Santa Barbara County in 1944 it was found on both seed stalks

and pods. The disease was insignificant on seed cauliflower during the past two seasons.

Frost injury (non-parasitic). - Frost injury to the foliage and curds was observed in the spring months in Monterey and Santa Barbara Counties on cauliflower grown in certain localities. In general no important damage resulted directly from frost, except when the curd was affected. In these cases parts or all of the curd surface turned brown and these areas later failed to develop seed stalks. Furthermore, during rainy periods following frost injury the killed tissue became subject to bacterial invasion. As a result of observations made during this survey it is believed that much if not all of the trouble referred to by growers as "brown spot" or "bacterial spot" (accredited to infection by Bacterium [Pseudomonas] maculicola) of the curd was in fact due to secondary bacterial breakdown following frost injury or perhaps following downy mildew.

Cauliflower mosaic (virus). - Seed fields containing as much as 10% and occasionally 20% of mosaic plants were found in both counties in 1943, and more frequently in 1944. There were indications that initial infection took place in the seed bed, and that the percentages of infection increased several times in the field during the spring months. Plants infected while small were stunted and these failed to develop into productive plants. However, the infections that developed in late spring did not seem to materially affect the productivity of such plants. Although cauliflower mosaic is not seed-borne the disease deserves attention from the production standpoint. All evidence points particularly to the importance of protecting the seed-bed from early infection through its isolation from other crucifers and through aphid control practices. Wild or escaped crucifers in weed strips bordering fields in which young cauliflower plants had been set out were believed to have been responsible, through aphid migrations, for the initiation of additional field infections.

Black ring (virus). - Although frequently seen on market cauliflower in the north, especially the San Francisco Bay region, this disease was rarely observed in the seed fields.

Miscellaneous diseases. - Occasional wire stem, caused by Rhizoctonia solani, was observed in the seed bed, and on young plants in the field. Traces of intumescences (non-parasitic) on the foliage, of unidentified viruses other than that of cauliflower mosaic, and heat damage to immature seeds while in the green pod stage, were also observed. Blasting of ovules in unripened pods also was found associated with heavy infestations of the lygus bug (Lygus spp.). In such instances normal appearing pods were found to contain at maturity a few to several partially or completely blackened seeds as well as perfectly normal live seeds. The dead or damaged seeds were found on examination to be free from bacteria or fungi at the time of their removal from such pods. "White stem" or blanching of one side of the smaller seed branches was occasionally seen and is believed to be the result of sunburn. Root rot, caused by Phytophthora megasperma, was encountered infrequently in low, poorly drained areas in the field. Club root (Plasmodiophora brassicae) has been observed on crucifers in the truck garden district near Colma in San Mateo County but not elsewhere.

Diseases Not Found

During the years covered by the survey (1942-1943 and 1943-1944) no instance was found where any plant of seed cauliflower was infected with black rot (Bacterium campestre) [Xanthomonas campestris], blackleg (Phoma lingam), club root (Plasmodiophora brassicae), or yellows (Fusarium oxysporum f. conglutinans). Also, no bacterial spot (Bacterium [Pseudomonas] maculicola) was recognized. This freedom of the seed cauliflower area from the seed-borne diseases of major importance to States east of the Rocky Mountains parallels the findings previously reported by the writers for seed cabbage (4).

Summary

The cauliflower seed-producing areas of California, which now supply the bulk of the nation's supply of cauliflower seed, were surveyed for diseases during the 1942-43 and 1943-44 crop seasons. Most of the plantings were found in coastal areas of Monterey, Santa Barbara, and San Luis Obispo Counties.

Downy mildew, white blight, and mosaic appeared to be the more important diseases of the crop but they have not yet become generally important from the production standpoint, and may be considered insignificant from the standpoint of seed quality. Other diseases found, usually in light or trace amounts, include powdery mildew, white rust, Alternaria leaf spot, ring spot, and Phytophthora root rot.

The diseases not found include black rot, blackleg, yellows, club root, and bacterial spot.

It would appear to be of great significance to users of cauliflower seed that California seed fields have been found to be free from black rot, which is a major seed-borne disease of crucifers, as well as from other important seed-borne diseases such as blackleg. It is believed that warm-temperature wet-weather seed-borne diseases such as these do not establish themselves under California conditions because of climatic conditions. The seed beds are started in the dry summer period and the seed is harvested the following year during the corresponding rainless season. When the rainy season sets in during the winter months, the temperatures are low and unfavorable to all but cool temperature diseases such as downy mildew and white rust.

Since California seed fields do not have black rot or blackleg, seed raised there does not require the hot water treatment to rid it of internal infection by these organisms. California therefore fully meets the needs (5) for a source of cauliflower seed free from black rot and blackleg. All observations indicate moreover that the California seed crops of other members of the cabbage tribe such as cabbage, broccoli, kohlrabi, and Brussels sprouts are likewise free from these seed-borne diseases.

Literature Cited.

1. Jones, W. Downy mildew disease of cauliflower seed plants. Sci. Agr. 24: 282-284. 1944.
2. Ramsey, G. B. Peronospora in stored cabbage. Phytopath. 25: 955-957. 1935.

3. Smith, Ralph E. Diseases of truck crops. California Agr. Ext. Circ. 119. 1940.
4. Snyder, W. C., and K. F. Baker. Diseases of seed cabbage in California. U. S. Dept. Agr. Plant Dis. Reprtr. 27(18): 394-398. 1943.
5. Walker, J. C. In Cauliflower and broccoli varieties and culture. U. S. Dept. Agr. Farmers' Bull. 1957: 16-17. 1944.

DIVISION OF PLANT PATHOLOGY, UNIVERSITY OF CALIFORNIA, BERKELEY AND LOS ANGELES.

SWEETPOTATO STORAGE DISEASES IN EAST TEXAS

R. D. Watson

During the period from February 12 to 19, a survey was made of the sweetpotato storage houses in some of the principal sweetpotato producing counties of East Texas. With one exception noted in the table (a new variety developed by a Lindale grower called locally Golden Skin) all the sweetpotatoes covered in this survey were of Porto Rico variety.

In East Texas, as a rule, sweetpotatoes are moved from the field directly into storage with no heat curing or artificial humidity, and usually keep well with less than 5% loss probably because natural fall temperatures are favorable for curing, unless the lot is injured in the field by cold weather, rough handling, as was the case this year due to labor shortage, or infected by disease as is evident in many lots examined showing high percentages of disease. It appears that rough handling due to labor shortage and inexperienced help is at least partly responsible for the high amount of surface rot (Fusarium oxysporum) and soft rot (Rhizopus nigricans) present this year. Soil rot or pox (Actinomyces ipomoeae) was much less injurious this year than last year.

Seed roots inspected in small farm storages of the growers' own seed or sweetpotatoes were notably freer from diseases than the market sweetpotatoes; especially is this noticeable in the case of black rot.

In this survey actual counts were made where it was possible and the amount of disease is recorded on the basis of the samples taken. Two sampling methods were followed: The first was to take from 2 to 10 bushels of sweetpotatoes from different parts of the storage house, grade them, and count the total number and the number of diseased roots present. The other method involved the cooperation of the grower and his grading crew in cases where they were grading sweetpotatoes. A count was made of the number of bushels of No. 1's, No. 2's, and culls, and representative samples of the culls and No. 2's were regraded and counts of the amount of disease made.

If a loss estimate due to diseases is to be made on the basis of this survey one would probably consider roots affected by black rot (Ceratostomella [Endoconidiophora] fimbriata), soft rot, brown type rot, and charcoal rot (Sclerotium bataticola) as a total loss and the average percentage loss would equal the sum of average percentage of these diseases, or 8.6% loss. The other diseases, dry type rot on tip of roots causing very little injury, soil rot, and surface rot do not represent a total loss and if it is estimated that these diseases cause an average loss in value of 25% of the number infected, then the total loss due to diseases

Table 1. Summary of survey for sweetpotato storage diseases in East Texas, February 12 to 19, 1945

County	City	No. storages visited	No. bushels, grower stored, 1945	Percentage, Diseases: Black rot %	Surface rot %	Soft rot %	Dry rot, ends %	Soil rot %	Brown type rots %	Charcoal rot %	Other diseases %	Culls %	Sample examined
Smith	Tyler	1	100	6.0	-	-	-						2 bu.
					1.6	-	-	3.0					2 bu. seed selected
		2	20,000		5.9	1.5	6.0						5 bu.
		3	10,000		16.0	4.0	2.7						5 bu.
		4	15,000		1.0		2.3	3.5			1.0		5 bu.
		5	5,000		8.0		1.3						5 bu.
		6	20,000		20.0	8.0	2.0						20 bu.
	Lindale	7[a]	50			35.0	16.0						2 bu. small seed
		8		37.0	7.0	1.0		1.0					10 bu.
		9	25,000	3.0		7.8	3.2					25	600 bu.[b]
		10	35,000	0.4	0.5	0.2	1.3	-	2.1		0.7	10	1605 bu. total
		11	40,000	3.2	2.1	3.0	2.8		3.0			23	38 bu.
		12	100[c]	1.3	2.3	0.4	2.1		0.4				100 bu.
Anderson	Palestine	13	5,000			20.0	1.0	1.0					3 bu. graded seed
		14	30,000	5.0	1.0	3.0				2.0		20	10 bu.
Camp	Pittsburg	15	25,000	2.0	7.0			21.0					3 bu.
				20.0[d]		5.0			5.0				
				50.0[d]									
		16	40,000				14.0	2.0					5 bu.
		17	50,000	5.0	0.7	1.4			0.6			13	400 bu., 25 bu. culls counted
		18	25,000	4.0	0.8	1.2	0.3	1.3				15	35 bu., 6 bu. culls counted
		19	10,000	8.0	12.0			3.0					2 bu.
		20	5,000		2.0	10.0	4.0	7.0					5 bu. seed potatoes

Table 1 continued.

Table 1 continued,

County	City	No. storages visited	No. bushels, grower stored, 1945	Percentage, Diseases: Black rot	Surface rot	Soft rot	Dry rot, ends	Soil rot	Brown type rots	Charcoal rot	Other diseases	Culls	Sample examined
				%	%	%	%	%	%	%	%	%	
Camp	Pittsburg	21	25,000		1.0	0.4		0.5					5 bu. seed potatoes
		22	15,000	5.0	7.0	6.5				5.5			2 bu.
Upshur	Gilmer	23[e]	2,000		35.0	11.0		6.0		3.0			3 bu.
		24	120,000	2.4	1.2	1.3	0.9			2.0	0.5 dried mummies	8[d]	10 bu. culls counted
Franklin	Mt. Vernon	25	2,000			4.0	2.0						2 bu.
Titus	Mt. Pleasant	26	2,000			4.0	4.0						2 bu. certified
		27	5,000		12.0		1.0	1.0					2 bu. farm storage
		28	5,000			2.0	1.0	1.0					2 bu. certified seed
Morris	Omaha	29	1,000		3.0	1.0		1.0					2 bu. certified seed
		30	2,000		6.0	5.0		7.0					2 bu. farm storage
Wood	Quitman	31	8,000			1.0		1.0					2 bu.
		32	5,000		8.0		1.0	6.0					2 bu.
	Golden	33	800			1.0							2 bu.
		34	1,000	3.0	1.0	3.5	1.0	1.5	1.5			2.	100 bu., 5 bu. culls counted

Table 1 continued

County	City	No. storages visited	No. bushels, grower stored, 1945	Percentage, Diseases: Black rot %	Surface rot %	Soft rot %	Dry rot ends %	Soil rot %	Brown type rots %	Charcoal rot %	Other diseases %	Culls %	Sample examined
Wood, Franklin Hopkins	Winnsboro	35	20,000	1.0	1.5	2.0		1.0		0.5		10	200 bu., 5 bu. culls counted
Cherokee	Jacksonville	36	2,000		3.0	4.0	1.0	1.0					2 bu. seed
Total			576,000	156.3	166.6	148.2	70.9	69.8	12.6	13.0	2.2	145	
No. of storages with disease				17	27	29	22	20	6	5	3		
Average percent of each disease				4.1	4.4	3.9	1.9	1.8	0.3	0.3	0.06	Total percent disease	16.8

[a] Farm storage in barn under hay, no heat or attention.

[b] 150 bushels culls - 10 bushels culls.

[c] Golden Skin (new variety).

[d] Estimation of disease as it ran over washer.

[e] Several years on same ground. Not adequate rotation.

would be about 10.6% for 1945 in East Texas.

The trouble called in this report dry rot of the ends of the sweet-potatoes is a rot that appeared to develop in the field and was present when brought into storage. Typically it stops and causes no further damage in storage and only a small portion of the root becomes involved. At the time of this survey these tip ends of the root appeared as a dry hard rot that seems to be sealed by a periderm or callus formed by the sweet-potato. Specimens of this trouble have been sent to Dr. Ray who reports principally Penicillium sp. and Alternaria sp. with only one isolate of Rhizopus nigricans.

Brown types of rots were slow developing rots that appeared at the time to be different from the other types recorded and counts were made in the field on that basis. The rotted tissue is brown and without noticeable odor and the rate of rotting is apparently slow. Isolations made by Lindsay S. Olive showed chiefly Sclerotium bataticola.

EMERGENCY PLANT DISEASE PREVENTION PROJECT

REPORTS ON CONDITION OF STORED POTATOES AND POTATO SEED STOCKS

Reports are of Emergency Plant Disease Prevention Project surveys.

POTATO STORAGE DISEASES IN NEW YORK: At Elba one lot of 30,000 bushels and another of 47,000 bushels of Katahdins were being graded. Ringrot (Corynebacterium sepedonicum) was present in amounts of about 0.5% in both lots. A trace of Fusarium dry rot (Fusarium spp.) was also present in both cases. In the lot of 30,000 bushels, silver scurf (Spondylocladium atrovirens) was present on about 90% of the tubers. Seventy percent ranged from very light to very heavy with an average of light to moderate. A slight amount of deep scab (Actinomyces scabies) was also present. In the lot of 47,000 bushels there was a trace of late blight rot (Phytophthora infestans) and a trace of blackleg (Erwinia atroseptica.)

At Knowlesville one lot of 1,430 bushels of Katahdins and one lot of 73,150 bushels of Smooth Rurals were examined. Both lots had a light infection of Rhizoctonia [solani] and a trace of late-blight tuber rot.--Robert C. Cassell, February 26-Mar. 2.

CONDITION OF POTATO SEED-STOCK IN SOMERSET AND WORCESTER COUNTIES, MARYLAND: The week of March 5-10 was spent examining the potato seed-stocks belonging to growers in the lower Eastern Shore region of Maryland (Somerset and Worcester Counties). Farmers in this area grow 2 crops a year. For summer planting most growers obtain northern-grown certified seed, chiefly from Maine but also to some extent from North Dakota, Wisconsin, and Prince Edward Island. This is held in cold storage until used. From this crop growers save their own seed for spring planting. Some of this stock is held in central storage-houses (operated by fertilizer companies) the rest in the growers' own storage houses or home cellars.

Following hurricane damage of last summer several growers have an insufficient supply of seed and a number of them will plant northern certified seed this spring. Occasional growers have in the past obtained and used northern-grown seed that was not certified.

The chief object of this survey was to determine the presence or absence of bacterial ringrot (Corynebacterium sepedonicum) which had not been previously observed in the area. It was found (diagnosis by Dr. L. S. Olive) in amounts of 5% or more in the seed-stock of 2 Worcester County growers. Stocks belonging to 38 growers were examined and it is believed that ringrot is absent, or nearly so, from all of these farms except the 2 mentioned.

Aside from the occurrence of ringrot the seed for the area is in good condition. Enlarged lenticels were common and were observed in varying amounts in 19 lots of seed. Frequently they were abundant enough to roughen the tuber all over its surface and in several lots of seed nearly all tubers were affected. Diseases observed and amounts were: late-blight tuber-rot, 2% to 5% in 3 lots of seed; stem-end browning (cause undet.), 0.5% to 2% in 13 lots of seed; common scab (Actinomyces scabies), 2% to 12% in 17 lots, 25% in one lot; dry rot (Fusarium sp.), 0.5% to 1% in 6 lots; blackheart (physiogenic), 5% in one lot which had been removed from commercial storage and held several days in a closed room heated by a stove, a trace in another lot; freezing injury (physiogenic), slight amounts in 2 lots.

All of the tubers examined in 2 lots of certified seed and 15% of the tubers in a third lot showed black-scurf (Pellicularia filamentosa). In one lot of certified seed 1% of the tubers showed common scab and in another 1% showed stem-end browning. -- A. J. Mix

DISEASES AND INJURIES IN CERTIFIED POTATO SEED RECEIVED IN SOUTH CAROLINA: During the period between January 23 and 30, 1945, some time was spent with J. A. Berly and M. B. Stevenson of the South Carolina Crop Pest Commission inspecting carload lots of certified Irish potatoes shipped into the Charleston, South Carolina area for seed.

The following data on these carload lots were obtained:

Origin	Variety	Diseases Present and Prevalence
Prince Edward Island, Canada	Cobbler	Trace Rhizoctonia
	Katahdin	Trace Scab
	Cobbler	Trace Rhizoctonia & hollow heart
	Cobbler	Trace Rhizoctonia and scab
	Katahdin	Trace Scab
	Cobbler	Trace Rhizoctonia and scab
Minnesota	White Rose	Trace Late blight rot
Maine	Cobbler	Trace Scab and stem end browning
Michigan	Pontiac	Trace Rhizoctonia and scab

With the permission of Mr. Stevenson the inspection sheets of the 68 cars of potatoes arriving in the Charleston area this year have been seen and the above information is representative of all the seed potatoes shipped in with the following exceptions.

Cold injury was present in a few lots because of a lack of proper insulation on the floor and around the doors, and one lot did not have enough heat in transit.

Bacterial ringrot was found in one lot of Katahdins after the seed had been cut. The crew had thrown out the diseased tubers and from these 10 to 15 tubers were found to be infected with this disease, which was identified by both Dr. C. N. Clayton, Pathologist at the Charleston Truck Experiment Station, and Dr. L. A. Olive at Beltsville, Maryland. Mr. Borly stated that this was the first time bacterial ringrot had been found in certified seed potatoes from Maine and that Maine authorities had been notified concerning their findings.

A trace of late blight rot was found in some lots from Prince Edward Island, Maine, and Michigan. - Alton E. Prince.

POTATO STORAGE DISEASES IN MICHIGAN: A survey of potato storages in Otsego, Antrim and Montmorency Counties (northern part of the lower peninsula of Michigan) has just been completed. Most of the table stock in this area is produced on 10- to 20-acre fields. In this survey special attention was given to the inspection of home storages of the table stock growers who usually retain a portion of their crop for planting next year's crop. The inspection of 86 storages containing 99 lots of potatoes in a relatively short time was made possible by the assistance given by the county agricultural agent, Mr. Arthur Glidden, and farmer members of the Ring Rot Control Committee who accompanied the writer to these farms at which they knew potatoes were in storage.

Bacterial Ringrot (Corynebacterium sepedonicum). The rapid spread of bacterial ring rot in this area has caused concern among both the table stock and certified seed growers. In Otsego County a Ring Rot Control Committee has been formed. This organization is attempting to eradicate the disease from the county by encouraging the disposal of all infected seed lots and emphasizing the value of thorough sanitary measures to prevent contamination of ringrot-free stock. Where ringrot was found during the survey, the representative of this committee advised the grower to dispose of his entire crop as table stock and to purchase certified seed for this year's planting. The stories they related about local growers' experiences with planting ringrot-infected seed did much to convince the grower that it was time for a change.

Of the 99 lots examined 23 contained a trace or more of ringrot that could be detected. Because of the possibility of not being able to detect a trace of ringrot in a lot of potatoes by a single bin inspection, it is highly probable that more than 25% of the lots contained infected tubers. In 1941 the only observed ringrot infection in Otsego County was that from a single lot of infected Pontiac seed planted on 3 farms. The crops from these fields were used as livestock feed and never removed from the farm. That this source of infection was immediately checked is evidenced by the fact that no bacterial ringrot could be detected on these farms the following year. The findings of the present survey reflect the rapidity of spread of this disease in Otsego County during the past 3 years. In view of the potential losses which could result from the planting of affected seed the situation is considered serious.

The extent of loss attributable to ringrot in 1944 could not be accurately determined because only a few of the lots examined were field run. Where the disease had been most destructive, the tubers now in storage have already been sorted several times and the rotted tubers removed. Furthermore the percentage of tubers left in the field because of the rot

could not be determined. Several growers reported losses ranging from 50 to 90% of their crop.

During the course of the survey it was evident that many of the farmers are not yet familiar enough with the symptoms of the disease to distinguish ringrot from the other diseases affecting tubers. Several lots of potatoes which were reported to contain considerable ringrot were found to be affected by stem-end browning, wilt, bacterial soft rot, or field frost, but to be free from the ringrot disease.

Common Scab (Actinomyces scabies). In general, common scab was more serious in this area than it has been for several years past. Approximately 80% of the lots examined had sufficient scab to affect their grade appreciably. In many lots 50 to 90% of the rejections from U. S. No. 1 grade were made because of scab lesions. Approximately 25% of the crop produced in Otsego County in 1944 could not be graded as U. S. No. 1 because of scab. Very little scab was found on the few lots of the Menominee variety, which is considered scab resistant. The varieties Erie and Sebago were generally less severely scabbed than Chippewa or Russet Rural. Pontiac was most heavily scabbed, although a few lots were examined that contained only a negligible amount.

Late Blight (Phytophthora infestans). Although late blight did not develop in the fields until the very end of the growing season, many lots of potatotes in storage showed a trace or more of late blight tuber infection. Favorable weather conditions for the development of the fungus on the green vines in October provided fairly abundant inoculum for tuber infection. In most lots the loss did not exceed 10% and in many bins very few blighted tubers could be found. In one case 94 bags were culled out from 240 bags because of blight. Most growers stopped spraying in September.

Dry Rots (Fusarium spp.). A trace to 3% of dry rot was observed in the majority of the storages inspected. In general, the Erie and Pontiac varieties appeared to be less severely affected. In several cases field frost provided entrance points for the tuber-rotting fungi.

Stem-end Vascular Discoloration (Fusarium oxysporum ?). A trace of 3% of stem-end vascular discoloration was observed in many of the lots of Russet Rural examined. This trouble seemed to be most prevalent in the Gaylord area. Several farmers in the county have been confusing the symptoms of this disease with those of bacterial ringrot.

Vascular Discoloration, Glassy type (? Fusarium [solani f.] eumartii). A stem-end rot, with vascular discoloration accompanied by a glassy appearing brown rot of the adjacent tissues, which often extended throughout the length of the tuber, was found in several lots. In one lot approximately 5% of the tubers were affected. The symptoms are typical of those caused by F. [solani f.] eumartii.

Blackleg (Bacillus phytophthorus) [Erwinia phytophthora]. A trace of tuber rot due to the blackleg organism was observed in several of the lots examined. In some of the affected tubers the decay had proceeded into the center of the potato, destroying it completely, leaving a hollow shell with a black and slimy lining. Some growers were mistaking these symptoms for those of advance stages of ringrot.

Black Scurf (Rhizoctonia solani). Black Scurf was common only on the tubers produced in the Atlanta area. In this area some of the growers reported poor stands because of this disease.

Bacterial Soft Rots. Bacterial soft rots were found in a trace in some lots. In those lots which had been frosted badly in the field bacterial

soft rots were causing appreciably more loss.

Frost Damage and Freezing. In the Johannesburg area approximately 50% of the crop of the late maturing varieties was lost because of a heavy field freeze. Of the tubers harvested from these fields 5 to 20% showed marked internal discoloration characteristic of frost damage. Freezing in storage accounted for a trace to as much as 20% loss in several home storages where adequate protection from the cold was not provided.

Air Checks (physiological). Rapid growth stimulated by rainfall at the end of the growing season renders the tubers of susceptible varieties extremely subject to air-checking. The Pontiac variety was by far the most severely affected. In some lots of this variety almost 100% of the tubers were affected.

Cuts and Bruises (mechanical). Injuries due to cuts and bruises received in the digging and subsequent operations affected the quality of many of the lots. On the lots harvested before full maturity was reached the bruises caused noticeable blemishes on the skin of the tubers. Some of the cuts provided points of entrance for the various organisms which produce tuber rots in storage. -- Alvin J. Braun, Feb. 19-Mar. 7.

POTATO STORAGE SURVEY IN WASHINGTON AND OREGON: Opportunity to observe the 1944 potato crop after extended storage on farms and in local warehouses was very limited. Stocks were sorted and shipped much earlier than in past years. It is questionable whether the limited observations possible could properly be used as an index for estimate or comparison with previous crops. The ultimate loss this season will depend on the success of the efforts to salvage as much as possible of what would normally be left in cull piles. However, with these reservations, it appears that losses during storage in the 1944 crop would have been equal to or greater than those in 1943 if the stock had been graded and held in the same manner.

With the cooperation of Dr. W. W. Ray, more attention was paid to the type of rot and the organisms observed or recovered from these in culture. Dr. Ray commented in his report on the specimens that "there seemed to be no consistent relation between fungus isolated and symptoms between the various tubers". It is obvious that we know too little about what may result from infection by the respective organisms, either alone or in combination, under a variety of conditions starting during late season in the field and following through harvest and storage, to recognize and properly classify specimens observed in surveys.

Clark, Skagit, and Whatcom Counties, Washington (February). The following organisms were noted in the survey or recovered from selected specimens:

Rhizoctonia and scab (Actinomyces scabies) were prevalent but not particularly conspicuous on the tubers in the storage observed at this time.

Species of Fusarium were a primary cause of storage losses. It was not possible to readily identify the species in all cases. The Discolor, Martiella, Roseum, and Elegans sections of the genus were represented in isolations from a limited number of specimens. F. sambucinum and F. coeruleum were identified among those recovered from the specimens.

Leak (Pythium debaryanum), like Fusarium rots, was common. Next to Fusarium this organism is a major cause of storage loss.

What appears to be Phytophthora infestans has been recovered from a variety of specimens. (Dr. Ray reports his findings to me as "Phytophthora

infestans?"). In some cases these tubers show a tan-colored internal rot. In others, brown to tan streaks occur through the tissues. The breakdown of these tubers in storage is slower than in lots where the "picture book" type of specimen is conspicuous. In some cases other fungi such as Fusarium sp. and Rhizoctonia were evident with the Phytophthora, and in others not.

A sterile fungus that "produces an abundance of yellowish-green mycelium in culture" has been recovered from specimens. In some cases this is evident on cut tubers in storage. In other instances it has been collected when its presence was not apparent. From mere observation in storage, it seems to be restricted to certain localities, or in some cases certain fields of a locality.

Stysanus stemonitis was recovered several times from the limited number of specimen tubers.

Verticillium cinnabarinum occurs quite frequently on or in rotted tubers. Dr. Ray reports that he has never been able to isolate it from tissues bordering cavities where it occurs in these specimens. From observations in storage, it is not evident what part this organism may be playing in destruction of the tubers.

Other as yet unidentified organisms were recovered in cultures.

Klamath County, Oregon (Jan. 31-Feb. 2). According to producers, losses due to leak (Pythium debaryanum) were larger than usual. Limited observations support this claim. Warmer weather than usual during harvest seems a likely factor in the increase of loss due to this type of rot.

Rots due to Fusarium spp. were a primary cause of loss. Species of the Elegans, Martiella, and Discolor sections of the genus were isolated from specimens. F. sambucinum f. 6 was recovered from tubers showing a dry rot at the stem end, and from others showing necrotic flecks within the tuber. The disorder in the latter type of tuber might readily be mistaken to be physiological. It occurred where an excessive amount of irrigation had been used during midseason.

Rhizoctonia was prevalent but not in conspicuously large amounts on the tubers. This organism was recovered from within the tissues of tubers showing a stem-end rot. Fusarium sp. of the Martiella section was recovered from the majority of tubers in this lot. It appears as if Rhizoctonia may be a secondary invader in this instance.

Verticillium cinnabarinum was also recovered from certain specimens. Whether this may be playing a primary or secondary role as the cause of rot, is not revealed by examination of the specimens. Dr. Ray reports that this organism was not recovered from tissues bordering the cavities where it occurs.

Bacterial ringrot (Corynebacterium sepodonicum) was noted in cull piles at warehouses. No severe infection was noted in farm storage visited at this time.

Rootknot nematode [Heterodera marioni] was noted in several lots. Producers were generally aware of the problem in control of this pest.

One lot of potatoes observed had greatly enlarged lenticels. According to local observers, excess irrigation had been applied to this crop. This was probably a primary factor in the large loss due to a variety of storage rots found in this lot.

Scab (Actinomyces scabies) was quite prevalent in one locality of the area. Apparently some soil condition of the locality favors the development of this disease.

On the whole, losses due to net necrosis were not so large as noted in the 1943 crop. Two severe cases were observed. These were grown from seed reported to be two years from certification.

Cuts, rough skin, hollow heart, growth crack, second growth, cellar green, sunburn, and frost rot were noted but not generally as of major significance.

Yamhill County, Oregon (Feb. 15). There was opportunity in this area to observe some 40 lots of Burbank potatoes grown by a single producer and stored under comparable conditions in a large modern warehouse. The most striking thing was the great variation in amount and type of rot between lots from respective fields. Loss in some lots may reach 15%. A wet type of rot appeared to be a primary cause of loss. In many cases this was not typical leak (Pythium debaryanum).

The following organisms were noted by Dr. Ray in his study of the specimens referred to him: Fusarium spp. of the Elegans, Discolor, Martiella, and Roseum sections, Fusarium coeruleum (end rot), Phytophthora spp., probably both P. infestans and P. erythroseptica, Stysanus stemonitis, Verticillium cinnabarinum and V. albo-atrum. -- Lytton W. Boyle

STORAGE DISEASES OF APPLES IN VIRGINIA AND WEST VIRGINIA

R. E. Atkinson

Because of reports from various sources of excessive losses from apple rots in cold storage and after shipping large apple storages in the eastern panhandle of West Virginia and at Winchester, Virginia were visited during the week of February 4 with R. S. Marsh, head of the Department of Horticulture at West Virginia University.

At almost all storages growers and storage managers admitted that considerably more rot was developing than usual. Cold storage men in general attributed it chiefly to the large percentage of poor quality stored this year.

It was true in all storages that more rot was developing in the Utility, Combination, and Virginia domestic grades, which often contained many drops. However, high percentages of rot (around 10%) were also found in many lots labeled U. S. No. 1 grade.

Some storage men claimed that certain lots of apples had been subjected to low temperatures in the field. It was difficult to check this claim, but it was very evident that in some poorly constructed houses temperatures below the apple freezing point (27-29°F) had been experienced. One storage man's complaint that "apples seem to freeze more easily this year" might be due to this years' repeated and prolonged low temperatures, which resulted in damage, while the same temperatures in other years because of the short duration or because they only happened once, merely resulted in undercooling and caused no injury. Another factor that might be responsible is the early ripening of apple varieties in storage, which is very generally reported this year by apple inspectors. The riper the fruit the less resistant it is to freezing.

At the Winchester storage apples in "Friday Pack" crates were being repacked. These are cardboard boxes with egg crate-like compartments made of papier mâché separating individual apples. Fruit being discarded in

this repacking operation totaled over 25%. Although the number of rotted apples was very high the greatest percentage of discards were split, or more aptly, burst. The splits had occurred in storages; they were not growth cracks. The apples were mostly Stayman; there were a few Black Twigs. Rot was greater in the latter, while the splitting was principally in Staymans. Splitting did not occur in the same lot packed in baskets.

The rot observed in all storage houses was caused almost exclusively by Penicillium. There was a trace of brown rot [Monilinia fructicola], black rot, [Physalospora obtusa], and bitter rot, [Glomerella cingulata]. Bitter pit [physiogenic] was reported by inspectors, but was not seen by the writer. Scald [physiogenic] appeared later this year than usual; it was found in many lots of Black Twigs, and in a few Grimes and Staymans. Considering the dry weather in 1944 there was suprising amount of scab, [Venturia inaequalis], which ranked next to codling moth as a cause of grade reduction. Storage scab was found developing in one lot of Staymans.

Last year's infestation of codling moth was heaviest since the early 1920's. Most of the damage, however; was due to "stings", in which the fruit was entered by a poisoned worm which soon died. Normally most codling moth injuries, stem punctures, bruises, and other injuries will dry up and no rot develops. This year, in most storages, these injuries developed into rot. Undoubtedly high humidity in these storages contributed most to the unusual amount of rot. High humidity in turn was caused by the late rains following the summer drought, which caused the fruit to be distended with water. Fluctuating temperature also contributed to the high humidity, which was over 90% in the average storage. The bursting of the Staymans in the "Friday Pack" seen at Winchester was undoubtedly due to the excess moisture in the fruit and to the 100% humidity in the airtight cardboard container. Holes cut in the sides of the box would probably have prevented this loss.

Labor conditions contributed to the excessive breakdown and rot in storage. The prolonged picking period caused much of the improper fruit maturity. Delay in storing was due to the use of entire crews for picking, and then packing only on wet days. Hurried picking and packing and inexperienced crews caused excessive bruising.

In spite of all difficulties several well managed and well constructed storages had a minimum loss from rot and had received no complaints from brokers and market men about the keeping quality of their apples.

During the week February 26 to March 3, apple storages were visited in Roanoke, Staunton, Crozet, Timberville and Winchester, Virginia. Apple processing plants in Crozet and Timberville were also inspected. Some apples being processed had been stored in the open without cover at Timberville. The last of these apples and apples from cold storage were coming in adjacent chutes at the cannery. The apples for processing in cold storage at Crozet were in bins, while those at Timberville were piled ceiling high on the floor of the storage.

The manager at the processing plant claimed that the apples kept as well in the open as in storage. He said that the winter was ideal for outside storage in that there was little freezing and thawing, but much continuous cold. A layer of apples about a foot deep on the top of the pile froze and rotted and these acted as insulation, keeping the rest of the pile in good condition. Perhaps the last of the apples from outside storage included these from the outside of the pile, for these apples ran 50% rot as

they came in the chutes. The completely rotted apples sank to the bottom of the washing vat, but most of the apples were half or less rotted and were either discarded on the sorting rack or the rotten areas were cut out after peeling. The apples from the storage were better, running only about 25% rot. These apples piled high in the storage pressed juice out of the apples on the bottom and 3 to 4 inches of cider covered the floor. Humidity of course was practically 100% and these apples, from observations both in the storage and in the cannery, were running 25% rot, almost entirely Penicillium or blue mold. Rot in the bin storage at Crozet was about 10%; there was enough juice on the floor to keep humidity high.

In general, in the storages south of Harrisonburg, humidity is lower. Rot in excess of the usual amount is due chiefly to the number of drops and other poor quality apples in storage, attributed to employment of German war prisoners as pickers and to poor supervision of the regular pickers. Some No. 1 packs contain drops, as evidenced by the presence of Phytophthora rot.

Scald is increasing in severity and grocery stores have windows full of scalded Staymans and Black Twigs. Bitter pit was seen in Grimes Golden and York. Weather cracking and the resultant shriveling was seen this week in the Albemarle Pippin and earlier on Grimes Golden. A lenticel breakdown in Pippin, which was present in several lots at a storage at Crozet, referred to Dr. John W. Roberts was identified as a "common tendency of Pippins, accentuated by certain sprays". In this and a pink spot also common on Pippins no pathogen was present, according to Dr. L. S. Olive.

An outbreak of storage scab in a common storage south of Roanoke was reported to the writer. The apples stored as No. 1's had to be sold as No. 1 canners' grade after storage.

EMERGENCY PLANT DISEASE PREVENTION PROJECT

STORAGE TROUBLES REPORTED ON OTHER CROPS

Reports are of the Emergency Plant Disease Prevention Project surveys.

VEGETABLE STORAGE DISEASES IN NEW YORK: CARROTS representing 312,000 bushels were examined in 15 cold storages in Wayne, Monroe, Orleans and Niagara Counties. Six of the storages had been seen about a month ago, and 9 were storages that had not been previously visited this season.

Although outside temperatures have moderated somewhat since the middle of February very little change has been noted in the general keeping condition of carrots. However, most carrots have been removed from common storages and rot-inducing organisms are becoming progressively prevalent in the cold storages. Large quantities of carrots are still being held, as operators report that it is difficult to find a favorable market at the present time.

The following report is primarily based upon the 9 storages not previously visited and reported upon.

Generally speaking, 3 rot-inducing organisms can be found in most storages. They are Sclerotinia sclerotiorum causing watery soft rot, Botrytis spp. causing gray mold rot and Alternaria radicina causing black rot. Watery soft rot was found in 8 of the 9 storages and was definitely the

most prevalent disease in 5 storages. Gray mold rot was found in 7 of the 9 storages and was the most prevalent rot in 2 storages. Black rot was also found in 7 of the 9 storages but in no case did it appear as the predominant rot. However, in 2 storages, Alternaria, Botrytis, and Sclerotinia appeared to be present in about equal proportions. Other organisms encountered and their relative prevalence are as follows: Penicillium sp. was found as a trace in 2 storages. Rhizopus sp. was found only on an occasional carrot in 2 storages. Fusarium sp. was found as a trace in one storage.

In most carrot storages the accumulated loss to date will range from a trace to 3% with an average of 1.5 to 2%. It is only in a few cases of small lots that losses run higher. In Medina one lot of about 1000 bushels had been held in an undesirable common storage before transfer to cold storage. This lot will run about 15% loss at the present time, being most seriously affected by gray mold rot with some watery soft rot and a trace of Rhizopus rot. In a Sodus cold storage the top row of boxes just under the over-head pipes was partly frozen. The loss just under the pipes will approach 50%. Watery-soft rot was particularly severe here with some black rot also present. In a Marion cold storage one lot of 200 bushels had come into the storage with some field frost damage. Watery-soft rot and gray mold rot had become established and the loss at the present time is about 15%. There was also a trace of an unusual dry crown rot present, the causal organism of which has not yet been identified. In a Williamson cold storage a lot of 200 crates was found affected by a rot apparently different from the usually occurring rots. Associated with this rot was a white mycelial fungus which appeared to penetrate the carrot at numerous places, possibly associated with root hairs. The organism is being isolated and will be reported later. Loss from the rot at the present time ranged from 20 to 50% in the 200 crates.

ONIONS. At Lockport a lot of 1,633 bushels of onions in cold storage was examined and at Elba 50,000 bushels in common storage were examined. In both cases the total shrinkage was no more than 1%. At Lockport, smudge (Colletotrichum circinans) was present in light to moderate proportions on about 35% of the onions. Fusarium bulb rot (Fusarium sp.) was present on about 2% and black mold rot (Aspergillus niger) on about 4% of the onions. At Elba, Fusarium bulb rot was causing the most loss with bacterial soft rot (Erwinia spp.) also quite prevalent. Gray mold rot (Botrytis spp.), smudge, and black mold rot were present but less prevalent. -- Robert C. Cassell, Feb. 26-Mar. 2.

ONION STORAGE DISEASES IN OREGON: In Washington and Lane Counties, neck rot (Botrytis allii) was prevalent during February but in most cases not the cause of severe loss. However, in one locality in Washington County losses as high as 20% were claimed in late harvested lots. It appears that several days of sunny weather on damp fields before harvesting had allowed infection to travel down the weakened pipes into the neck. This was causing a rot of the inner scales and was not readily detected until the tip was cut from the bulb. This made sorting and grading difficult and costly. Losses were small in that part of the crop gathered under more favorable conditions of early harvest in this locality.

In many cases it appears that rot caused by Botrytis sp. following bruises due to rough handling in harvest and storage caused greater loss

than the strictly neck rot type of infection.

Penicillium sp. and bacterial soft rot were also noted. -- Lytton W. Boyle.

DISEASES REPORTED ON VEGETABLE CROPS

Reports are of the Emergency Plant Disease Prevention Project surveys.

FURTHER OBSERVATIONS IN NORTHERN NEW JERSEY: Report on fifth visit to northern New Jersey vegetable growers, March 14-16, 1945. Damping-off of lettuce (Rhizoctonia sp.) was still present at all the farms where it had previously been found, but had not increased sufficiently to necessitate revision of the estimates of losses reported earlier. In all cases growers had planted enough seed so that in spite of loss from damping-off they had an adequate supply of healthy seedlings for transplanting. Transplanting of lettuce to frames had been completed on this date and at 3 farms transplanting to fields had begun.

Farm 20 has been mentioned only once in earlier reports. No damping-off (or other disease) has ever been found here. The soil is very heavy and retentive of moisture as in the case of 2 other nearby farms (18 and 19) where damping-off has been severe. The different conditions on this farm are: a much better slope; soil comparatively "new", i.e. 6 or 7 years from sod (the completely "new" soil mentioned in a previous report was only placed in 2 frames); summer-fallowing of the soil in the frames (on the other 2 farms it is cropped); thorough washing of the sash last summer; and treatment of the soil with chloropicrin.

Damping-off and stem and root rot of cauliflower (Rhizoctonia sp.), seen earlier at 2 farms, were still present but damage is now inconsiderable.

Drop (Sclerotinia sclerotiorum) of lettuce was still present at Farm 2, but the earlier estimate of loss (10%) does not need revision. Drop (S. minor) of lettuce at Farm 18 was no longer observable.

Gray mold (Botrytis sp.) of lettuce was observed for the first time at Farms 4 and 18. Damage had increased somewhat at Farm 11; it was of no consequence at Farms 12 and 15.

Downy mildew of cauliflower (Peronospora parasitica) was observed for the first time at Farms 3 and 6; mildew spots occurring chiefly on the older and lower leaves. At these farms and at those where the mildew had been observed previously, infection seemed to have been checked by aeration of the frames and damage in all cases was inconsiderable.

The injury to lettuce seedlings at Farm 12 is continuing. An organism resembling Aplanobacter rhizoctonia Thomas (Ohio Bull. 359) has been isolated by Dr. L. S. Olive from seedlings submitted to him. The statement made in the last reports indicating that affected plants were recovering from this disease needs correction. In the farms where the disease was first observed affected plants are definitely retarded, though no longer appearing yellowed and dwarfed. More recently affected and younger plants seemed even more damaged, and perhaps 10% of them have been killed. What seems to be the same trouble has been found at Farm 2 in frames that had been kept covered most of the winter, preventing earlier observation. The damage here is considerable.

The cauliflower and cabbage plants at Farm 8 reported 2 weeks ago as growing slowly with poorly developed root systems were now growing well.

From what follows it is believed that they had been retarded by seed treatment with Spergon. In this greenhouse, where the soil is sterilized by electric heat, pepper and tomato seed had been treated with Spergon, a control flat being planted with untreated seed in each case. When observed the seedlings from untreated seeds were fully twice as large as those from treated seed. Seed treatment has retarded emergence and early growth to an extent that can be expressed by saying the "treated" seedlings were "a week behind" the "untreated". Damping-off was not present. -- A. J. Mix

POTATO DISEASES IN SOUTHERN LOUISIANA: The acreage planted in Terrebonne and Lafourche Parishes this year is approximately half of that planted last year. Apparently the primary reason for this reduction in acreage was the severe losses due to late blight, freezing, etc., experienced by the growers last season.

During the period March 5 to 10 some 20 fields were examined carefully. Another survey is to be made at a later date. There has been very little rain and no late blight (Phytophthora infestans) was found. Mild mosaic (virus) was found in most fields, the highest estimated percentage of infection being less than 10. Hair sprout (cause undetermined) was noted in trace amounts. Mr. Al Moreau, the county agent, reported 56% hair sprout in one field in Lafourche Parish, but this field was not seen by the writer.

In one field near Larose, Lafourche Parish, plants 4 to 5 inches high exhibited an unusual leaf malformation, in which the leaves strongly resembled those of spinach. Affected plants stood out clearly in comparison with other plants. In most instances the terminal and 2 lateral leaflets appeared to have fused, and the main petiole was somewhat flattened toward the terminal part of the leaf. There was a slight crinkling or cupping. The plants did not seem to be stunted in any way. An estimated 20% of the plants were thus affected.

Another peculiar condition was noted in several fields. Affected plants were somewhat stunted and stiffly erect, with crinkled leaves considerably smaller than normal. There was no mottling, nor was there evidence of necrosis. The number of affected plants varied in different fields, but in some fields appeared to be as high as 15 to 20%. -- Douglas C. Bain.

DISEASES OF WINTER CAULIFLOWER OR BROCCOLI IN OREGON: Douglas, Multnomah, Clackamas Counties, February. Adverse weather, insects, and virus diseases, each contribute to reduce the yield and quality of the current crop of winter cauliflower. Drought and a bad infestation of aphids hindered the plants in their early development.

Generally there has been considerable increase in the prevalence of virus diseases. Sufficient care has not been used to separate plant beds or young plantings from inoculum held in seed crops or wild species of Brassica. The vein-banding type of symptom is most apparent at this time. The black-ring type of symptom was prevalent only in plantings in a limited locality of Douglas County. Dr. Glenn Pound kindly tested specimens from this locality and reports that both turnip virus 1 and cauliflower virus 1 were found in them. By comparison on respective farms, an increase in percentage of infection is more common than a reduction from the past season.

Traces of ringspot (Mycosphaerella brassicicola) were observed in most fields. Severe infection occurred where young plantings were set adjacent

to seed plots. The gradation in severity of the disease from the vicinity of the seed plot to the more distant parts of the planting was very marked. Even the jacket leaves of plants in rows near the seed plot were well covered with lesions.

Alternaria brassicae was quite common on the older leaves of the plants.

During early February an ice storm in Multnomah County injured many heads that were nearly ready for harvest. This was more marked in fields where plants had been stunted by virus, and the stunted jacket leaves were not affording protection to the head as in the normal well-developed plant. -- Lytton W. Boyle.

DISEASES OF CRUCIFERS IN SOUTHERN CALIFORNIA: Mosaic (virus) was found in small amounts in most of the fields of cauliflower inspected in Ventura and Santa Barbara Counties during the first part of March, in company with Dr. Kenneth Baker of the University of California at Los Angeles. No visible symptoms of mosaic were observed in broccoli or cabbage. The aphid population was high in most of the fields of crucifers inspected. Downy mildew (Peronospora parasitica) was commonly found in all fields of both young and old plantings in Santa Barbara County. In plantings visited in Ventura County only a slight amount of downy mildew was present. White rust (Albugo candida) was commonly found on shepherds'-purse growing in or adjacent to cauliflower plantings. None was found on the cauliflower plants. Trace amounts of Sclerotinia sclerotiorum, cottony rot, were noted in several fields in Santa Barbara and Ventura Counties. Leaf spot (Alternaria brassicae) was found in all fields inspected in Santa Barbara and Ventura Counties.

In one field of cauliflower in the vicinity of Guadalupe, in an area approximately 1/2 acre in size at the lower end of the field, the plants were 100% affected with root rot (Phytophthora megasperma). -- E. W. Bodine.

SHORTER NOTES ON VEGETABLE DISEASES: ARTICHOKE. Leaf spot (Ramularia cynarae) was prevalent in all of the plantings in the vicinities of Guadalupe and Arroyo Grande, in Santa Barbara County in Southern CALIFORNIA, during the first part of March. -- E. W. Bodine.

BROAD BEAN (Vicia faba). Rust (Uromyces fabae) was widespread on plants in St. Bernard and Plaquemines Parishes in Southeastern LOUISIANA. A serious leaf spot disease that eventually results in firing was noted in several patches in the same area. Conidia of the Macrosporium type were solely and consistently associated with the spots. -- Douglas C. Bain, Mar. 5-16.

GARDEN BEET. Rust (Uromyces betae) was found on a few scattered plants in the vicinity of Lompoc, in Santa Barbara County in Southern CALIFORNIA. In Ventura County several fields of mother beet roots transplanted for the production of seed were found to be free from diseases. -- E. W. Bodine.

EGGPLANT. Leaf spot (Phomopsis vexans) was found in small amounts on plants in coldframes in St. Bernard and Plaquemines Parishes, LOUISIANA. Also in this area another leaf disease (Alternaria ? solani) was causing damage to plants in coldframes. -- Douglas C. Bain.

LETTUCE. Occasional plants in the young plantings near Earlimart in Tulare County in Central CALIFORNIA were infected with mosaic (virus). New plantings in the Salinas Valley in Monterey County appeared to be free from diseases. -- Henry Schneider, Feb. 26-Mar. 2.

A trace of lettuce mosaic was noted in a few fields in the Arroyo Grande district in Santa Barbara County in Southern CALIFORNIA. A few scattering plants were found affected with Sclerotinia sclerotiorum in the Santa Maria and Arroyo Grande districts. -- E. W. Bodine

ONION, LEEK, SHALLOT. Creole onion plants from a small garden at Raceland in Lafourche Parish, Southern LOUISIANA, sent in to the county agent, were infected with downy mildew (Peronospora destructor). This is the first time the disease has been seen this year. Leaves of red shallot in Plaquemines Parish were heavily spotted with an Alternaria of the A. porri type. -- Douglas C. Bain.

A trace of downy mildew was noted in one old onion planting near Lompoc in Santa Barbara County, southern CALIFORNIA. Plantings of leek in the vicinities of Santa Maria in Santa Barbara County and Reseda in Los Angeles County were found to be free from diseases. -- E. W. Bodine

PEAS. Traces of downy mildew (Peronospora viciae) [P. pisi] were present on young peas in Monterey County, Central CALIFORNIA. -- Henry Schneider.

Ascochyta blight was found on both the above- and below-ground parts in several large plantings along the coast north of Santa Barbara, in Southern CALIFORNIA. Approximately 50% of the plants in one field were affected. A trace of Fusarium root rot (F. solani f. pisi) was noted in 2 plantings in the same district. Pea mosaic (pea virus 1) was commonly encountered in all of the fields inspected in the Santa Barbara coastal area. Infection ranged from a trace to as high as 5% in one field. -- E. W. Bodine.

INITIAL INFECTIONS OF TOBACCO BLUE MOLD ON OLD AND NEW BEDS IN SOUTH CAROLINA

Alton E. Prince

The week of March 19 was spent in the eastern counties of South Carolina to determine whether the tobacco blue mold [downy mildew] fungus, Peronospora tabacina, appeared first in old or new beds. Dr. Paul R. Miller accompanied the writer on a portion of the trip. This week was chosen at the suggestion of T. W. Graham, Agent, Division of Tobacco Investigations at the Pee Dee Experiment Station, Florence, South Carolina, as the week when blue mold would first appear, an assumption which was correct although some growers reported that they first saw it in their beds about March 14.

The designation "old bed" is given to beds that were used for growing tobacco plants last year, while a "new bed" is one where tobacco had never been planted. Owners were contacted in every case where there was a question as to whether the bed was new or old.

The information obtained from 59 old beds and 82 new beds has been summarized in the accompanying table.

The 5 new beds with blue mold were in each case adjacent to old beds with relatively large patches of dead plants resulting from blue mold infection, indicating that the fungus had been present at least a week and that the infection in the new beds was secondary, an assumption that is supported by the fact that infection was just starting.

Table 1. Occurrence of the Tobacco Blue Mold Fungus on Old and New Beds in South Carolina - March 19-23, 1945.

County	Old beds		New beds		Total no. beds examined
	Blue mold present	Blue mold absent	Blue mold present	Blue mold absent	
Florence	10	4	0	7	21
Horry	14	20	1	42	77
Williamsburg	2	2	0	22	26
Georgetown	None observed	None observed	0	3	3
Marion	6	1	4	3	14
Totals	32	27	5	77	141

There seemed to be a correlation between presence or absence of blue mold in old beds and heavy burning of old bed sites. Some growers who had rigorously burned their old bed sites had no blue mold while their neighbors who had not burned or who had burned lightly already had blue mold present. However, burning was done to control weeds rather than the fungus.

Only one grower was attempting control measures. He was using para-dichlorobenzene but it is doubtful whether his treatment will be effective.

Problems in pre-emergence and post-emergence damping-off were evident but not enough material was collected to make determinations of the agents involved.

EMERGENCY PLANT DISEASE PREVENTION PROJECT

REPORTS ON DISEASES OF CEREALS AND FORAGE CROPS

Reports are of Emergency Plant Disease Prevention Project surveys,

DISEASES ON BARLEY IN CENTRAL CALIFORNIA: Powdery mildew (Erysiphe graminis) was general in Kern and Monterey Counties at the beginning of March. Slight to moderate damage was being caused in older fields with dense stands in which the plants had reached about a foot in height. Traces of net blotch (Helminthosporium teres) were found in Tulare and Kern Counties.

Slight to moderate amounts of powdery mildew were observed in one field on Marsh Creek Road in Contra Costa County during the middle of March. None was observed in several other fields. -- Henry Schneider.

DISEASES ON OATS IN SOUTHERN LOUISIANA: Crown rust (Puccinia coronata) infection was heavy in some fields in the Teche country (Bayou Teche, Iberia Parish). Trace amounts of the uredial stage of stem rust (P. graminis var. avenae) were noted in 2 small fields along Bayou Lafourche (Lafourche Parish) near Napoleonville; the variety was probably Camellia. A leaf spot of undetermined cause was also common in this area. -- Douglas C. Bain, Mar. 5-16.

ALFALFA DISEASES IN SOUTHERN CALIFORNIA: In the vicinity of Lompoc in Santa Barbara County, stem nematode (Ditylenchus dispsaci) was commonly

found in several fields inspected. In one field, all of the plants were infected in a large area running parallel to the irrigation dykes and approximately 2/3 the distance of the field.

Alfalfa dwarf (virus) was found in the vicinities of Buellton in Santa Barbara County and Oxnard in Ventura County. A trace of each of downy mildew (Peronospora trifoliorum) and leaf spot (Pseudopeziza medicaginis) were found in a few fields in the vicinity of Buellton in Santa Barbara County.

Leaf spots (Pseudopeziza medicaginis and Pyrenopeziza medicaginis) and downy mildew (Peronospora trifoliorum) were commonly encountered in all fields inspected in the San Fernando Valley in Los Angeles County. In most of the fields visited in the San Fernando Valley the incidence of mosaic was quite high (10 to 20%). Some damage resulted, due to the stunting of the plant growth. -- E. W. Bodine, weeks ending Mar. 3 and Mar. 10. (In Santa Barbara and Ventura Counties in company with Kenneth Baker, University of California at Los Angeles).

BLIGHTING OF AUSTRIAN WINTER PEAS IN SOUTHERN LOUISIANA: Serious blighting and killing was observed in several large fields in the Teche country (Bayou Teche, Iberia Parish). Associated with the condition were aphids, a Colletotrichum of curved spore type, Mycosphaerella (? pinodes), and Erysiphe polygoni.--Douglas C. Bain, Mar. 5-16.

A MICROSPHAERA ON SOYBEANS: The writer reported (PDR 28 (33): 1008, 1944) a powdery mildew on soybeans as a collection made in the fall of 1944. The usual examination of the material showed the oidal stage and undeveloped cleistothecia.

In December, while at Raleigh, North Carolina, Dr. S. G. Lehman informed me that he had found a single leaf on a single soybean plant in the greenhouse infected with a Microsphaera. A re-examination of my earlier collections yielded 3 cleistothecia mature enough to show the characteristic branched appendages of a Microsphaera, whereupon the material was turned over to Dr. Lehman and to Mr. Bernard Ellison, a graduate student, who was making drawings and spore measurements for identification purposes. -- Alton E. Prince.